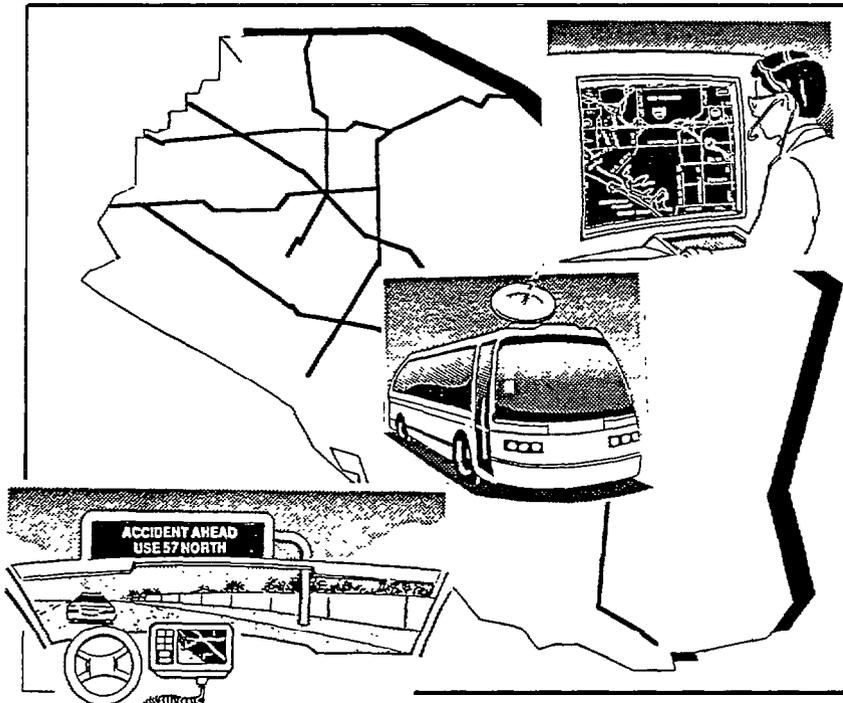


ORANGE COUNTY INTELLIGENT VEHICLE/HIGHWAY SYSTEMS STUDY

Action Plan (Draft)

JUNE, 1993



Prepared for



OCTA

Prepared by

j h k & associates

HUGHES

SGNA

Jacqueline Golob Associates

**ORANGE COUNTY INTELLIGENT
VEHICLE / HIGHWAY SYSTEMS STUDY**

IVHS ACTION PLAN

DRAFT

Prepared by:

**JHK & Associates
300 South Harbor Blvd.
Suite 516
Anaheim, CA 92805**

June 1993

TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	1-1
2. FUNDING AVAILABILITY	2-1
2.1 Public Funding of IVHS Improvements	2-1
2.1.1 Guiding Principles and Assumptions	2-2
2.1.2 Funding Components	2-6
2.1.3 Implications	2-8
2.1.3.1 Measure M	2-8
2.1.3.2 Local Financial Participation	2-9
2.1.3.3 Vehicle Registration Fees	2-9
2.1.3.4 State TSM and FCR Funds	2-9
2.1.3.5 State Rideshare Funds	2-9
2.1.3.6 CMAQ and STP Funds	2-10
2.1.3.7 IVHS Act Funds	2-10
2.1.3.8 Transit Funds	2-10
2.1.4 Annual Maintenance Costs	2-11
2.1.5 Summary	2-12
2.2 Private Sector/Public-Private Partnerships	2-12
3. PRIORITY OF PROGRAMS	3-1
3.1 Introduction	3-1
3.2 Ongoing Programs/Operations Tests	3-2
3.3 First Level Priorities	3-3
3.4 Second Level Priorities	3-6
3.5 Third Level Priorities	3-7
3.6 Fourth Level Priorities	3-9
3.7 Enabling Projects	3-9
4. IMPLEMENTATION	4-1

APPENDIX A - PROGRAM IMPLEMENTATION SUMMARY

1. INTRODUCTION

This report is a result of the efforts undertaken for Task 6 of the Orange County Intelligent Vehicle-Highway Systems (IVHS) Study, the development of an Action Plan for implementation of the Orange County IVHS Master Plan. The Master Plan, as presented in Task 4 of this study, calls for the development of an estimated \$601 million countywide program.

Based upon technology and construction constraints, JHK & Associates estimates a significant portion of the County program is achievable within a ten year time period. However, a review of both funding availability and the logistics of coordinating sizable, multijurisdictional projects, indicates that ten years is an improbable time frame for implementation of the entire program. The “Action Plan for Deployment of IVHS in Orange County” reviews funding opportunities, together with countywide priorities in terms of technological needs, to develop an implementation strategy for IVHS within the County.

The Action Plan consists of these introductory remarks and three succeeding sections as follows:

Section 2, Funding Availability, looks at the specific funding levels anticipated to be available from various sources over the next several years.

Section 3, Priority of Programs, identifies the staging of the programs developed in the IVHS Master Plan and prioritizes the programs for implementation purposes

Section 4, Implementation, provides an Action Plan for the implementation of the IVHS Master Plan programs based upon anticipated availability of funding.

Appendix A contains a detailed summary of prioritized programs and implementation sites, along with related costs recommended responsibilities for implementation.

Complementing this Action Plan will be a Final Report which incorporates the recommendations of the Technical Memorandums produced during the multiple phases of the Orange County IVHS Study. Together, the Action Plan and Final Report will serve as the

documents to guide development of IVHS in Orange County over the next twenty years. However it is intended that these documents serve only as guides, as both future technological and funding developments may suggest future modifications to these recommendations.

2. FUNDING AVAILABILITY

Section 2 presents the specific funding levels anticipated to be available from various sources over the next several years. While the availability of funds is significant in terms of the total annual dollar figure, the source of these funds is also of primary significance, as the funding source may determine:

- what type of project the funds may be allocated towards (e.g., air quality attainment versus vehicle control technology development)
- what phase of the projects may be funded (e.g., concept design, construction, operations)
- what projects the funding may be used for as matching funds (e.g., regional or state funds can be used to match federal funds)
- the state of readiness a project must be in to obtain the available funds

2.1 PUBLIC FUNDING OF IVHS IMPROVEMENTS

Implementation of the IVHS action plan is dependent upon available funding. The Task 5 Technical Memorandum discussed potential sources for funding the IVHS program. This section of the Action Plan identifies “order-of-magnitude” funding amounts which would be needed to fund the IVHS Program. The funding sources and amounts identified herein can be viewed as a preliminary strategy for securing the required funding for implementation of IVHS over the next two decades. As with any transportation improvement, IVHS will necessarily compete with other projects for limited transportation sources. Decisions regarding the allocation of monies rest with various funding agencies, and in particular, will be dependent, to a large extent, upon policy decisions to be made by the OCTA, Caltrans and local agencies. Therefore, the plan that follows is merely a suggested starting point from which to base future funding decisions. Formulation of a comprehensive financial plan for IVHS will be required once an implementation commitment is made. As project estimates and timelines are adjusted, financial strategies will also require modification. This is especially true since many state and federal fund sources cannot be projected beyond 5-6 years time.

The total estimated capital cost of the program (excluding AVCS components) is \$512,734,000. Exhibit 2.1 contains the anticipated capital needs for each IVHS component along with the approximated expenditure timeframe. In the short term (2 years), it is anticipated that approximately \$6 million is needed to fund early implementation components of the IVHS. Most of the program, from a technological standpoint, can be implemented within a 5-10 year timeframe. More advanced components such as AVCS, are targeted for implementation in a 20 year timeframe, and, therefore, have been excluded from this funding evaluation.

In addition, engineering costs associated with the IVHS Program components will add \$87,897,000 to the IVHS program, bringing the total program development cost to \$600,031,000. Annual maintenance cost for the fully implemented IVHS is estimated at \$50,562,000. A summary of the engineering and annual maintenance costs associated with each IVHS component is presented in Exhibit 2.2.

2.1.1 - Guiding Principles and Assumptions

In pursuing IVHS program funding, several guiding principles will be applicable:

- Implementation of IVHS will require significant coordination between jurisdictions. This same principle of cooperation will apply to securing and dedicating funding for the IVHS program. For example, cooperative funding strategies will likely need to be identified at the Growth Management Association (GMA) level.
- Dedicating funding to the implementation of IVHS may reduce, or at least delay funding for other transportation improvements. Therefore, the Steering Committee will need to work toward an inter-agency consensus regarding the dedication of competitive fund sources to IVHS.
- Project applications will need to be strategically structured to define self-contained buildable components of the IVHS. Moreover, self-contained buildable components will need to be defined in relation to multiple-fund sources where matching monies are required.

EXHIBIT 2.1

IVHS CAPITAL COST SUMMARY

2, 5 and 10 YEAR TIMEFRAMES

(1993 Dollars - 000s)

PROGRAM	CAPITAL COSTS	Timeframes		
		0-2yr	0-5yr	0-10yr
UTIP	\$6,926	\$3,356	\$3,465	\$105
Intertie	\$13,083		\$13,083	
FMIS	\$12,863		\$12,863	
AMIS	\$37,380	\$1,050	\$7,875	\$28,455
Invision	\$201,327		\$252	\$201,075
AVL	\$2,016			\$2,016
F-Instr.	\$40,449		\$40,449	
A-Instr.	\$74,844		\$74,844	
TOC/TMCs	\$24,780		\$7,455	\$17,325
Expert	\$15,750			\$15,750
EPS	\$263		\$263	
RIC	\$36,908		\$158	\$36,750
Adapt	\$22,607		\$22,607	
Ramps	\$10,710		\$10,710	
Int/Meter	\$735		\$735	
Smart/Bus	\$11,507	\$1,575	\$6,374	\$3,359
Interride	\$630		\$630	
RITA	\$158		\$158	
TOTALS	\$512,936	\$5,981	\$201,921	\$304,835

EXHIBIT 2.2

**IVHS ENGINEERING AND MAINTENANCE COSTS
(1993 Dollars - 000s)**

PROGRAM	ENGINEERING	ANNUAL MAINTENANCE*
UTIP	\$1,187	\$660
Intertie	\$2,243	\$1,246
Pub.Info.	N/A	\$40
FMIS	\$2,205	\$1,225
AMIS	\$6,408	\$3,560
Invision	\$34,513	\$19,174
AVL	\$346	\$192
F-Instr.	\$6,934	\$3,852
A-Instr.	\$12,830	\$7,128
Det.Maint.	N/A	\$200
TOC/TMCs	\$4,248	\$2,360
Support	N/A	\$370
Expert	\$2,700	\$1,500
EPS	\$45	\$25
RIC	\$6,327	\$4,635
Adapt	\$3,875	\$2,153
Ramps	\$1,836	\$1,020
Int/Meter	\$126	\$70
Smart/Bus	\$1,938	\$1077
Interride	\$108	\$60
RITA	\$27	\$15
TOTALS	\$87,896	\$50,562*

* Based on full-build for programs as listed.

- Funding schemes will need to follow the logical development order of IVHS components. Therefore, close coordination between system development planning and financial planning will be imperative.
- Because the IVHS is multi-jurisdictional by nature, overall program implementation and funding oversight by OCTA will be indispensable. OCTA-sponsored calls-for-projects will need to reflect IVHS implementation objectives.
- As currently envisioned, IVHS implementation will require the dedication of approximately \$600 million over the next 10 years. Sole dependence on existing, limited revenue sources is likely to delay implementation or require a reduction in the scope of the system. If IVHS implementation is to be achieved within a 10 year period, then new dedicated revenue sources will be required.

IVHS is an ambitious program in terms of costs, project phasing and multi-jurisdictional involvement. Success will ultimately be determined by the level of consensus and cooperation among the local, state and federal agencies in pursuing program funding.

In structuring the funding component of the action plan, several assumptions were made:

- Measure M monies would provide primary funding over the next two years to “kick-start” the IVHS program.
- Measure M will play a significant funding role in implementing IVHS over the next 5-10 years. The funding component of the action plan assumes approximately \$12 million per year will be applied to IVHS projects.
- Federal sources for IVHS will be aggressively pursued through the remainder of the federal ISTEA period.
- Use of State TSM funds for MIS program implementation should primarily focus on state facilities and local facilities included in Smart Corridors. Thus, implementation of the Orange County IVHS is not in competition with state funding objectives. Rather, the focus of the IVHS use of TSM funds is on implementing the portion of the countywide system which most directly affects the state.
- A significant portion of the \$18.7 million in TSM funds to be programmed in District 12 will be dedicated to the implementation of IVHS projects.
- State TSM or FCR funds will be used to leverage and match federal CMAQ or STP funds.

- **Local Cities will become financial** partners by dedicating a portion of state tumback funding (Local Prop 111 subventions or other municipal funds) to implementing local elements of the IVHS Local cities will use these funds to leverage Measure M, state or federal funds to implement IVHS components in their jurisdictions.
- Transit-related components of IVHS will be funded with existing transit sources as part of the development of Orange County’s transit system
- State rideshare funds will be sought and applied to the INTER-RIDE component of MIS. Other potentially available rideshare fund sources will be pursued to advance Orange County ridesharing into the 21st century.
- SLTPP funds will be sought to construct “ready” projects. Because Orange County has already received 23% of the amount of funds allocated statewide, these funds may not be as available to Orange County as in the past.

2.1.2 - Funding Components

In terms of program implementation, it is assumed that most of the \$7.2 million required over the next two years will be funded through various Measure M programs. Based on available technologies, most program components could be implemented within 10 years. If this timeframe was followed, approximately \$50 million per year in funding would be required over the next 10 years for capital costs alone. This is a significant amount to fund from existing revenue sources. For comparison purposes, Measure M generates approximately \$27.5 million per year for expenditures in the Streets and Roads program categories. This fiscal year, Orange County received \$7.3 million in state TSM funding and approximately \$13.5 million and \$19.8 million per year in CMAQ and STP funds, respectively. Taken together, these key source generated only \$56 million for this year.

Thus, there is a significant funding shortfall for implementing the project within a 10 year timeframe, unless new funding is identified or aggressive pursuit of federal IVHS funds is initiated.

Exhibit 2.3 contains a suggested funding allocation plan from which to begin formulating a financial plan for implementation of IVHS. The table identifies potential funding sources for each IVHS program component. Basic assumption regarding the mixture of funding sources are also delineated. The figures are based only on the capital cost of the program and exclude funds

EXHIBIT 2.3

IVHS CAPITAL FUNDING (1993 Dollars - 000s)

	M	RegFee	Local	TSM	FCR	SLTPP	Rides	CMAQ	STP	IVHS	Sec. 9	Private	TOTALS	ASSUMPTIONS
UTIP	\$6,034		\$982										\$6,926	Assumes M 2yr start-up w/ 25% local match thereafter
Intertie	\$5,887	\$1,308			\$5,888								\$13,083	Assumes 10% Reg. Fees, then 50/50 M/FCR
FMIS				\$6,431				\$6,432					\$12,863	50/50 TSM and CMAQ funds
AMIS	\$18,890		\$3,738										\$37,380	50/10/40/M/Local Cities/TSM
Invision				\$14,952						\$161,062		\$20,265	\$201,327	Federal IVHS funds with 10% state, 10% private match funds
AVL	\$403									\$1,813			\$2,016	Assumes target IVHS funds with M match not TSM
F-Instr.				\$20,224				\$20,225					\$40,449	50/50 TSM and CMAQ funds
A-Instr.	\$56,133		\$7,484	\$11,227									\$74,844	75/10/15 M/Local Cities/TSM
TOC/TMCa				\$4,956					\$19,824				\$24,780	Assumes target federal STP funds with 20% state match
Expert				\$5,870						\$12,280			\$16,750	Assumes target federal IVHS funds with 20% state match funds
EPS	\$263												\$263	Local funds
RIC	\$19,008				\$17,900								\$36,908	M funding for Initial Implementation, then 50/50 M/TSM
Adapt	\$7,535					\$7,535			\$7,537				\$22,607	33/33/34 M/FCR/STP funds
Rampe					\$5,355				\$5,355				\$10,710	50/50 FCR/STP funds
Int/Meter	\$735												\$735	Local funds
Smart/Bus	\$2,827										\$8,480		\$11,307	Assumes early M transit funds, then federal transit funds
Interride							\$630						\$630	Assumes state rideshare funding
RITA										\$158			\$158	Federal IVHS funding
TOTALS	\$117,515	\$1,308	\$12,114	\$83,480	\$23,143	\$7,535	\$630	\$26,657	\$32,716	\$174,935	\$8,480	\$20,265	\$512,738	

for system engineering. For this analysis, it is assumed that funding of engineering costs will for the most part follow funding schemes for the capital costs.’ The funding allocation also excludes maintenance costs.

The capital funding allocations contained in Exhibit 2.3 target fund sources based on general eligibility criteria and IVHS program component characteristics. It must be reiterated that the figures contained within the table do not represent specific funding recommendations. Rather, they provide an embarking point for preparation of a comprehensive financial plan.

2.1.3 - Implications

Several implications can be drawn from the funding evaluation. They are discussed below:

2.1.3.1 - Measure M

OCTA is currently reviewing the incorporation of IVHS as an eligible category within the Signal Improvement program for the next call-for-projects. Measure M is a logical “fast-track” source for funds for the initial years of IVHS implementation. A more critical implication is the need to determine the extent that Measure M will fund IVHS implementation over the program’s life. As the IVHS program is only now being defined, there are no designated criteria for funding IVHS-type projects within the Measure M programs. If IVHS is to be adopted as a countywide strategy, then a thorough assessment of the role that this source will play is needed immediately. This assessment should address the amount of Measure M funding to be dedicated to the program along with the role the funds will play vis-a-vis other potential fund sources, especially relative to state and local financial participation.

As indicated in the suggested funding allocation, IVHS implementation would require a

Measure M program eligibility criteria. Moreover, the use of Measure M funds can be reduced as other fund sources as aggressively tapped.

2.1.3.2 - Local Financial Participation

The funding allocation assumes that local cities, the County of Orange and the State will participate in funding and maintaining localized elements of IVHS. Without this partnership spirit, delay of the program will be inevitable. Implicit in this assumption is that these agencies will adopt complementary policies for spending local monies on IVHS technology.

2.1.3.3 - Vehicle Registration Fees

AB 2766 added an additional \$4.00 to vehicle registration fees. Thirty-percent of the revenues generated are returned to local governments. An additional 30% is allocated to a regional "discretionary" fund. The allocation plan targets a modest \$1.3 million of these funds to finance a portion of the Intertie component. Registration fees subvented to local governments could be applied to IVHS by the recipient local government to support the identified local participation.

2.1.3.4 - State TSM and FCR Funds

The funding allocation targets significant amounts of TSM and FCR monies. In order to meet or exceed these targets, consensus over the IVHS program must be reached with Caltrans and regional authorities regarding the application of these funds to this purpose. More importantly, it will be critical that as much TSM funds be directed to implementation of IVHS freeway-related elements as possible. Roughly \$8.4 million per year of TSM and \$3 million of FCR funds are assumed to be diverted to IVHS purposes.

2.1.3.5 - State Rideshare Funds

OCTA receives state rideshare monies to fund its Commute Services program. This

program consists largely of employer outreach to encourage ridesharing and the development and maintenance of a countywide ridesharer database. The Interride component of IVHS seeks to advance the technology associated with this existing program. Therefore, the funding allocation assumes that a portion of the existing state funds will be applied to the development of Interride. This will require negotiation with the state to include IVHS Interride development in the annual work programs submitted by OCTA to the state for funding purposes.

2.1.3.6 - CMAQ and STP Funds

The funding allocation assumes that a significant portion of future CMAQ and STP funds flowing to Orange County will be dedicated to IVHS implementation. \$2.7 and \$3.3 million in CMAQ and STP funds, respectively, are proposed for the program.

2.1.3.7 - IVHS Act Funds

The suggested allocation plan relies on a high level of IVHS funding over the next 10 years. Specifically, this fund source is identified as the key source for the INVISION component. As over the next 6 years, approximately \$600 million is available on a national basis. Most of the amount needed for implementation of Orange County's IVHS is required 5 to 10 years from now. This time period lies outside the ISTEA timeframe. Therefore, two assumptions are made specific to this funding source. The first is that Orange County will aggressively pursue IVHS funding over the next 5 years and, if successful, will accelerate the implementation of the additional program components. The second is that a similar funding program will be included in the next federal surface transportation act.

It also important to note that pursuit of this source must be closely coordinated at the state and district levels of Caltrans as Caltrans has initiated several projects under this funding program.

2.1.3.8 - Transit Funds

The allocation plan also assumes that a portion of existing Section 9 federal transit

funding will be diverted to IVHS transit components. Additionally, the suggested allocation plan assumes that Measure M transit funds will be applied early in the IVHS program to fund the first two years of the Smart Bus component

2.1.4 - Annual Operations and Maintenance Costs

When fully implemented, the IVHS Network will cost approximately \$51 million per year to operate and maintain. This cost has not been specifically allocated to named funding sources. However, several sources are structured so that they may provide operations and maintenance funding. These include State TSM funds, and Federal STP and National Highway System (NHS) funds. While these funds are able to be allocated to operations and maintenance, they have not been traditionally allocated for these purposes, largely because operations and maintenance allocations shrink the pot of monies available to other programs/phases.

The estimate of maintenance costs for the County's IVHS program highlights the need for an allocation of monies for the operation and maintenance of emerging intelligent vehicles and highways. Therefore, allocation of operation and maintenance funding should be pursued by the County and local agencies through Federal and State funding sources such as those identified. Additionally, the Federal, State, and Regional funding agencies need it impressed upon them that operations and maintenance of IVHS is beyond the current capabilities of local agencies and new funding sources must be identified.

At the same time, it is realized that some maintenance funding will need to be made available from the agency who has jurisdiction over a particular roadway/area. Thus maintenance of IVHS components will also be folded into State operating budgets and, to some extent, the local cities' budgets as well.

Clearly, the full development of IVHS has serious financial implications for all participant agencies. Although this level of maintenance cost will accrue over time as the system becomes fully operational, this issue must be addressed at the onset of the programs implementation with an aim to identify ongoing sources of maintenance funding.

2.1.5 - Summary

Financing the implementation of the IVHS Program poses a significant financial challenge to Orange County. As can be seen from the suggested Capital Funding allocation, a large variety of funding sources will have to be tapped if IVHS is to become a reality for Orange County. The overall program, although significant in dollar terms, represents a small portion of the total transportation investment in Orange County. Nevertheless, funding of the IVHS will require a countywide consensus to systematically apply limited existing resources to the program. Moreover, it will require a partnership between Orange County agencies and Caltrans to pursue mutually agreed project which work toward implementation of the overall system. Lastly, because of the diversity of likely funding source and complexity interjurisdictional issues, financing of the IVHS will require the leadership of the OCTA to direct a comprehensive, long-term financial strategy for the program's implementation.

2.2 PRIVATE SECTOR/PUBLIC-PRIVATE PARTNERSHIPS

In addition, opportunities are available to increase the desirability of the County defined IVHS programs to potential funding sources and also promote the involvement of private sector firms in funding the programs. A number of firms, both local and national, have expressed an interest in participating in IVHS projects and financially supporting the project through contributions of goods or services. Some of those firms which have expressed the interest or ability to contribute financially to local projects include:

- Hughes Aircraft Company
- Odetics, Inc.
- Rockwell International Corp.
- Westinghouse Electric Corp.

Many other potential private partners can be identified by their demonstrated interest in IVHS through attendance at IVHS related conferences such as those sponsored by IVHS America, ITE, and Transportation Research Board. A brief review of IVHS America's 1993 Annual Meeting pre-registered attendees identified such potential private partners as:

- American Telephone & Telegraph
- Detector Systems
- Digital Equipment Corporation
- Ford Motor Company
- Jet Propulsion Laboratory
- Motorola
- Siemens Automotive
- Toyota Motor Corporation

(The above lists are not intended to be complete or signify the interest of these firms in participating in the development of the Orange County IVHS Master Plan. These are merely examples of firms which may be interested in participating in the County's programs.)

It is recommended that the IVHS Steering Committee direct the OCTA-IVHS Administration Staff in the identification and solicitation of private sector involvement in deployment of the IVHS Master Plan.

3. PRIORITY OF PROGRAMS

3.1 INTRODUCTION

Section 3 presents the priority and recommended staging of the projects developed in the IVHS Master Plan for implementation purposes. The program areas and their associated projects are as follows:

- 1) Traveler Information
 - a) Universal Traveler Information Program (UTIP)
 - b) Interagency Transportation Information Exchange (INTERTIE)
 - c) Public Information Campaign
 - d) Freeway Motorist Information System
 - e) Arterial Motorist Information System
 - f) In-vehicle Information/Navigation (INVISION)

- 2) Monitoring and Data Collection
 - a) Automatic Vehicle Location
 - b) Freeway Instrumentation
 - c) Arterial Instrumentation
 - d) Detector Maintenance

- 3) Traffic Management
 - a) TOC/TMCs
 - b) Agency Traffic Operations Support
 - c) Decision Support Systems
 - d) Emergency Priority System
 - e) Rapid Incident Clearance
 - f) Adaptive Signal Control and Signal Synchronization
 - g) Corridor Ramp Metering
 - h) Integrated Signal/Ramp Meter Control

- 4) High-Occupancy Vehicles
 - a) Public Transit/Smart Bus
 - b) Interactive Rideshare (INTER-RIDE)
 - c) Real-time Intermodal Travel Advisory (RITA)

- 5) Vehicle Control System
 - a) Support AVCS Development

In order to assess the appropriate scheme for the implementation of the projects listed above, the relative priorities of these projects are discussed below. First, ongoing projects, including those which are in the operational test stage, are discussed. Then, projects are grouped by level of priority and each are discussed as either first, second, third, or fourth level projects. Finally, projects which have been identified as enabling projects are discussed.

3.2 ONGOING PROGRAMS/OPERATIONAL TESTS

A number of the projects which have been identified for implementation in Orange County within the IVHS Master Plan are projects which have already been implemented to some extent within the County and/or are operational tests are currently being planned/conducted to evaluate the potential for further development of these projects. They include:

- 1) Rapid Incident Clearance
- 2) Signal Synchronization
- 3) Adaptive Signal Control
- 4) Integrated Signal/Ramp Meter Control
- 5) Mobile Surveillance Systems
- 6) Emergency Priority System
- 7) Integrated Transit/Traffic Management Systems

The first two projects, Rapid Incident Clearance and Signal Synchronization, are well underway within the County. Freeway service patrol is clearing incidents on portions of Interstates 5 and 405, and State Routes 91, 57, and 55. (Some of this service is provided by the Caltrans Orange Angels specifically to provide aid in construction areas.) Additionally, Signal Synchronization is a project area which has been supported by the County over a number of years through the OCUTT (Orange County Unified Transportation Trust) and Measure M programs. Through these programs, numerous traffic signal controllers and communications have been upgraded, and signal timings have been developed and implemented, for both regionally and

locally significant roadways.

It is recommended that these projects be continued at their present/historical levels at a minimum, and be considered as first level priority projects. Through evaluation of these ongoing projects, expansion of the projects (geographically or in terms of resources) should be considered and implemented at the appropriate time.

The remaining five projects have all been identified for operational testing. Projects 3, 4, and 5, Adaptive Signal Control, Integrated Signal/Ramp Meter Control, and Mobile Surveillance Systems, were selected by the Federal Highway Administration (FHWA) in 1993 as national tests. The remaining two projects, Emergency Priority System and Integrated Transit/Traffic Management Systems, are ideal candidates for operational testing and it is recommended that these are pursued for implementation as such.

All operational test projects will be accompanied with extensive evaluations of the projects and their potential for application as IVHS strategies. As all of these operational test projects encompass technologies or strategies which are in the testing stage, none of these projects are identified as first level priority projects. The definition and specific prioritization of these projects within the Orange County IVHS Master Plan beyond this discussion should be a component of the tests' evaluations.

3.3 FIRST LEVEL PRIORITIES

The initial priorities for IVHS implementation in Orange County are discussed below. These include:

- 1) Universal Traveler Information Program (UTIP)
- 2) Freeway Instrumentation (Smart Corridors)
- 3) Arterial Instrumentation (Smart Corridors)
- 4) Interagency Transportation Information Exchange (INTERTIE)
- 5) TOC
- 6) Public Transit/Smart Bus

As has been determined through identification of a Universal Traveler Information Program (UTIP) to receive IVHS early deployment funds from FHWA, the transmission of

travel information to the public is a County priority. The development of UTIP will provide for an additional benefit to be derived from the data collection efforts being undertaken for traffic management purposes, and will expose the public to some of the benefits of IVHS development. This priority is one which is shared on a national level as is exemplified by the writing of Thomas D. Larson, former Federal Highway Administrator,

“We have to pay for IVHS with today’s dollars. We need benefits, now and throughout a long, evolving development period, to reinforce the value of our continuing investment . . . Nobody, least of all the politicians who must appropriate the funds, is willing to wait . . . More than ever, we must keep in mind the need for piece-by-piece benefits to motorists, object lessons to maintain the enthusiasm for IVHS in the early days when it is not at its full potential.”

Larson emphasized this need for early successes and public support by comparing the development of IVHS with the development of the interstate system,

“Now that the interstate system is essentially complete, we may forget the many obstacles it faced and how close it came to being canceled early in its history. . . . Highway user revenue was too low to support construction, raising specters of deficit financing, which had been prohibited by law for the system, or huge tax increases. San Francisco and other urban areas quarreled over the routing of the interstate highways and the effects they would have on the communities through which they passed.”

Therefore, the attainability of a record of early success is a criteria for the prioritization of projects within Change County’s IVHS development, as is the ability to publicize that success and gain support from the public and political arenas.

In addition to the benefits which will be made apparent to travelers through implementation of traveler information, there is still a need to demonstrate IVHS benefits to traffic engineers within the County. Therefore it is important to achieve early successes in the area of traffic management. Critical to the goal of actively managing traffic, whether the need to manage is due to recurrent or non-recurrent congestion, is the ability to monitor the transportation network.

This ability can be gained on a local level through instrumentation of the freeway and arterial networks, and on a regional level, through the development of the Interagency

Transportation Information Exchange (INTERTIE) program. These projects will allow for the information exchange necessary for the operation of the six identified Smart Corridors.

Smart corridors have been identified as cost effective IVHS strategies capable of deriving immediate benefits in congestion reduction upon implementation. Thus, the ability to implement smart corridor strategies is a County priority. In addition to the transfer of transportation network data, the analysis of data and the analysis and coordination of traffic management responses are essential to the operation of a smart corridor. A traffic operations or traffic management center (TOC or TMC) provides the structure to house the people and equipment through which this analysis and coordination is achieved. As a first level priority, the Caltrans TOC should be viewed as a building block necessary for the implementation of smart corridor strategies, Additionally, the identified Smart Corridor freeway links and alternate routes are the roadways recommended for instrumentation within this level of implementation.

The development of the Public Transit/Smart Bus Program within IVHS involves four main areas:

- 1) Automatic Vehicle Monitoring System
 - Automatic Vehicle Location
 - Passenger Load Monitoring
 - Diagnostic Equipment Sensors
- 2) Data Collection
 - On-board Computers
 - Electronic Ticketing System
- 3) Information Processing
 - Schedule & Operations Planning Software
 - Computerized Database
- 4) Transit Operations Center

These areas have been grouped together within a single Smart Bus project due to their interdependence upon one another. The efficiency of a vehicle monitoring system is dependant upon the scheduling software available to reduce the data being supplied to transit operators, and

the scheduling software capabilities are enhanced through integration of such information as passenger loading and vehicle maintenance needs.

All of these Smart Bus areas, including data collection, share a common tie of dependency upon the availability of communication paths for the transmission of information between the transit operations center and the vehicle. This interdependency is exemplified by an ongoing study commissioned by OCTA to identify new fixed-route radio equipment. The study incorporates radio equipment, vehicle location technology, driver alarm, maintenance indications, on-time performance, schedule adherence, and schedule checking.

It is recommended that development of the Public Transit/Smart Bus Program be adopted as a first level priority for IVHS implementation by the County. As with the recommendation that the development of the Caltrans TOC be pursued as prescribed in the Caltrans Master Plan, it is also recommended that the development of the Smart Bus be pursued as recommended by the detailed study of the available hardware, software, and communication technologies.

The recommendation to pursue the development of the Smart Bus as a first level priority recognizes that, while a Smart Bus concept design should be all encompassing, due to funding availability, implementation of the design may be staged. Additionally, it is noted that funding which is identified for transit cannot support many of the other programs identified within the master plan, while the Smart Bus project is ideally suited for such funding.

3.4 SECOND LEVEL PRIORITIES

The second level of priorities for IVHS implementation within the County are identified below. It should be recognized that greater benefits will be realized as greater portions of the IVHS Master Plan are implemented. Therefore, the concurrent implementation of multi-level priorities, when feasible, is recommended to accelerate IVHS development.

- 1) Freeway Motorist Information System
- 2) Arterial Motorist Information System
- 3) Freeway Instrumentation
- 4) Arterial Instrumentation
- 5) Corridor Ramp Metering
- 6) TMCs

Complementing the monitoring and surveillance capabilities attained through instrumentation of the freeways and arterials, are freeway and arterial motorist information systems (MIS). It is recommended that implementation of MIS technologies on the Smart Corridor roadways be pursued as a second level priority as should both additional instrumentation and MIS implementation for the remaining IVHS Network.

The ramp metering of the freeway network should be completed as a second level priority project. Additionally, coordination of ramp meters with arterial traffic signals should be pursued as indicated by the results of the operational test of this strategy.

The local agencies currently operate traffic management centers of varying degrees of sophistication. It will be primarily the local agencies' and GMAs' responsibilities, with technical assistance provided through the IVHS Steering Committee and Administration Staff, to determine the configuration of these subregional TMCs. These TMCs will be developed in conjunction with the development of the Smart Corridors, Super Streets, and the remaining IVHS Network including locally identified roadways. Those agencies with jurisdiction over Smart Corridor alternate arterials will have the most immediate need to develop subregional TMCs.

3.5 **THIRD LEVEL PROJECTS**

The third level priority projects identified below consist of those projects for which the technology exists but implementation of these projects is either dependant upon the development of other projects or can be enhanced through the prior development of other projects. These include:

- 1) Automatic Vehicle Location (other than fixed-route buses)
- 2) Interactive Rideshare (INTER-RIDE)
- 3) In-vehicle Information/Navigation (INVISION)
- 4) Decision Support Systems
- 5) Real-time Intermodal Travel Advisory (RITA)

The first two projects, automatic vehicle location (AVL) for vehicles other than fixed-route buses (these will be equipped with AVL under the Smart Bus project) and interactive ride-share (INTER-RIDE), are recommended as third level projects because the prior

development of other projects will benefit the overall design and implementation of these projects.

The development of the Smart Bus will introduce AVL data into the County traveler information database. With this introduction, further instrumentation of vehicles with AVL (e.g., other public fleets such as police) will be able to provide added data to the overall information on the County roadway network in addition to providing fleet management capabilities for the equipped vehicles.

The interactive rideshare project is an extension of OCTA's existing rideshare match program. This project will increase the convenience and speed with which rideshare partners can be matched. This project will be enhanced with the development of the countywide traveler information system, first to customize the traveler with the process of selecting modes, routes, and time of travel based on real-time information, and second by developing and implementing traveler information centers through which rideshare information can be incorporated.

The remaining three projects have been recommended as third level priority projects because their implementation is directly dependant upon the implementation of prior projects. In-vehicle information/navigation (INVISION) will be dependant upon the instrumentation of the County roadways in order to convey real-time network information to the vehicle. Additionally, vehicle location capabilities will be necessary for the vehicle to which information is being transmitted in order to convey appropriate navigation directions.

Decision support systems such as knowledge-based expert systems are also dependant upon the data gathering capabilities of network monitoring and surveillance technologies. Additionally, the 'motorist information and traveler information system elements must be in place in order to allow for the management of transportation as directed by the decision support system.

Similar to both the in-vehicle information/navigation and decision support system projects, the implementation of a Real-time Intermodal Travel Advisory (RITA) is also dependant upon data gathering and information dissemination capabilities. RITA also requires instrumentation of public transit as prescribed through the Smart Bus project and could be implemented in conjunction with similar location capabilities on rail cars.

3.6 FOURTH LEVEL PROJECTS

Fourth level projects are those projects which are presently in the research and development stage and therefore do not hold immediate benefits for the County. Only one group of programs recommended within the IVHS Master Plan falls into this category AVCS Development.

While Automated Vehicle Control System (AVCS) development does not hold near-term benefits for the County, the long-term benefits are potentially great. The FHWA has a stated interest in developing AVCS technologies, and thus an interest in funding AVCS development. Additionally, this development will require extensive research and design input and financial contribution from the private sector. As was discussed previously, there are many local and national firms which are well positioned to participate in this development.

Orange County should pursue the development of vehicle control systems in conjunction with FHWA and private industry. This should be pursued as a research area which may involve the development of testbeds. The IVHS infrastructure which Orange County will develop under the higher level priority projects should place the County in an ideal position to serve as a testbed area for AVCS.

3.7 ENABLING PROJECTS

In addition to the interagency coordination and development of the NHS administrative structure through the formation of the Steering Committee and Administration Staff, there are a number of issues which will need to be addressed to further the successful implementation of IVHS in the County. Thus the following “enabling” projects have been defined:

- 1) Agency Traffic Operations Support
- 2) Public Information Campaign
- 3) Detector Maintenance

Agency traffic operations support will provide necessary assistance to the local agencies in the implementation of the previously defined projects. A public information campaign will

serve to gain public and political support for the planned projects and will increase the public's awareness of trip-making decisions and discourage turbulence producing driving habits. The detector maintenance program will ensure the quality of the information being collected through the system.

These enabling projects will ease the implementation process and enhance the functionality of the developed system. Thus these projects are recommended for immediate commencement and should be sustained on a long-term basis.

4. IMPLEMENTATION

Based upon the previous discussions of funding strategies and project prioritization, a recommended implementation schedule was formulated and is presented in Exhibit 4.1. This schedule provides an overview of the anticipated year of project commencement and completion. In several cases the length of the project signifies the geographical expansion of IVHS elements (e.g., roadway instrumentation) while in other cases the project length signifies further enhancements to functioning elements (e.g., transit traveler information system).

**ORANGE COUNTY IVHS MASTER PLAN
MONITORING AND DATA COLLECTION PROGRAMS**

	<u>Description</u>	<u>Implementation</u>												
		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2003 - 2008	2008 - 2013	
AVL	AVL for Other Public Fleets AVL for Private Fleets/Private Vehicles													
Freeway Instrumentation	System Detectors													
	CCTV													
	VIDS													
Arterial Instrumentation	System Detection													
	CCTV Cameras													
	VIDS													
Detector Maintenance Program	Contracted Maintenance													

APPENDIX A

**ORANGE COUNTY IVHS ACTION PLAN
PROGRAM IMPLEMENTATION SUMMARY**

First-Level Priority

	Description	Location/Phasing	Time Frame	Capital + Installation Cost (000's)	Engineering Design Cost	Responsible Agency			
Universal Traveler Information Program (UTIP)	Traveler Information Center (TIC) Traveler Information Database	To be determined At TIC -- Phase 1 Database (relational) At TIC -- Phase 2 -- GIS-based	2 years 2 years 5 years	2,100 1,050 2,100	378 189 378	OCTA/Caltrans OCTA OCTA			
	Information Servers CATV Broadcast Local Kiosks Private Kiosks Traveler Advisory Telephone Bulletin Board Server In-vehicle Interface Personal/Portable TIS Radio Data Systems Silent Radio	TIC/Cable Companies Transportation/Event Centers Event/Employment Centers At TIC At TIC At TIC/Private facilities? At TIC/Private facilities? At TIC/Private facilities? At TIC/Private facilities?	2 years 2 years 5 years 2 years 2 years 10 years 5 years 5 years 2 years	420 788 315 48 105 N/A N/A N/A	76 142 57 9 19 Private OCTA Private Private	OCTA OCTA Private OCTA OCTA/Private Private Private Private			
	Freeway Instrumentation (SMART CORRIDOR AREAS)	System Detectors/CCTV/VDS	Priority List 1. I-405 from I-5 to SR-22 2. SR-55 from I-405 to SR-91 3. SR-22 from I-605 to SR-55 4. SR-91 from SR-90 to Beach 5. I-5 from Oso Parkway to Euclid 6. SR-57 from I-5 to SR-90	5 years	8,410 4,808 6,007 5,206 9,612 4,808	1,514 865 1,081 937 1,730 865	Caltrans		
			Antenna Instrumentation (SMART CORRIDOR AREAS)	System Detection/CCTV/VDS	Priority List 1. Bolsa Chica from Warner to SR-22 SR-22 from Bolsa Chica to Beach Beach from Talbert to SR-22 Bolsa/First/Grand/Barranca from Bolsa Chica to Jeffrey Edinger/Irvine Center from Bolsa Chica to I-405 Warner from Bolsa to Grand Talbert/MacArthur from Beach to University SR-73 from I-405 to University University/Jeffrey from MacArthur to Irvine Center 2. Lincoln from SR-57 to SR-55 Tustin from SR-91 to I-5 SR-91 from Tustin to SR-55 Red Hill from I-405 to I-5 MacArthur from I-405 to Red Hill	2 years	645 2,387 2,532 2,597 3,016 710 2,226 484 919 403 1,436 65 726 194	116 430 456 467 543 128 401 87 165 73 258 12 131 35	Local/GMA

Local = Local Jurisdiction (e.g., City, County, State)

**ORANGE COUNTY IVHS ACTION PLAN
PROGRAM IMPLEMENTATION SUMMARY**

First-Level Priority

Description	Location/Phasing	Time Frame	Capital + Installation Cost (000's)	Engineering Design Cost	Responsible Agency
	3. Garden Grove from SR-22 to SR-22 Seal Beach from Westminster to SR-22 Westminster/17th from Seal Beach to SR-55 Bolsa Chica from Bolsa to SR-22 Tustin from First to SR-22 Bolsa/First from Bolsa Chica to Tustin 4. Orangethorpe from Beach to SR-90 Beach from Lincoln to Orangethorpe La Palma from Beach to SR-90 Lincoln/Santa Ana Canyon from Beach to SR-90 SR-90 from Santa Ana Canyon to Orangethorpe 5. Euclid from Edinger to Lincoln Harbor from Bolsa to Lincoln Bolsa/First from Euclid to Newport Newport from First to Irvine Edinger/Irvine Center/Moulton from Euclid to I-5 Dyer from Red Hill to Grand Grand from Dyer to First Red Hill from Alton to Irvine Irvine/Trabuco/Marguerite from SR-55 to Oso Oso from I-5 to Marguerite 6. State College from I-5 to SR-90 I-5 from SR-57 to State College SR-90 from State College to SR-57		887 177 2,323 339 371 1,161 1,887 308 1,952 2,016 2,807 1,194 952 952 274 2,081 97 403 548 2,500 129 710 129 65	160 32 418 61 67 209 340 55 351 363 505 215 171 171 49 375 17 73 99 450 23 128 23 12	
INTERTIE Program	Local Site 15 total (Locations agreed by GMA's) 37 total (one per agency or local TMS) 52 total	5 years	893 1,271 10,920	161 229 1,966	EMA / Local / GMA
TOC	Caltrans site Phase 1 - Interim TOC Phase 2 - Communications Phase 3 - Surveillance, control, MIS Phase 4 - Final		590 1,770 1,180 4,838	106 319 212 871	Caltrans
AVL	AVL for Transit		see below		
Public Transit / Smart Bus	Automatic Vehicle Monitoring (b caution, passengers, maintenance, etc.) Transit Operations Center Electronic Ticketing System Transit TIS	5 years 5 years 10 years	4,799 1,575 3,359 1,575	864 284 605 284	OCTA OCTA OCTA OCTA

**ORANGE COUNTY IVHS ACTION PLAN
PROGRAM IMPLEMENTATION SUMMARY**

Ongoing Programs /
Operational Tests

<u>Description</u>	<u>Location/Phasing</u>	<u>Time Frame</u>	<u>Capital + Installation Cost (000's)</u>	<u>Engineering Design Cost</u>	<u>Responsible Agency</u>
Rapid Incident Clearance (RIC)	Expand Freeway Network – wide In conjunction with Transit AVL All vehicles Smart Corridors / Network – wide	2 years 5 years 5 years 10 years	1,120 (annual) 105 53 36,750	19 10 6,615	Caltrans / CHP Caltrans / OCTA Caltrans / CHP Caltrans / CHP
Signal Synchronization	<u>Priority List</u> 1. Smart Corridor Alternates 2. Smart / Super Streets 3. Other significant roadways	5 years	21,453	3,862	Local
Adaptive Signal Control	Purchase for Countywide use	5 years	1,155	208	OCTA / Local
Integrated Signal / Ramp Meter Control	Countywide	5 years	735	132	Caltrans / Local
Mobile Surveillance Systems	Mobile	2 years	N/A		Operational Test Committee
Emergency Priority System	Testbed	5 years	263	47	OCTA
Integrated Transit / Traffic Management Systems	Anaheim	5 years	N/A		OCTA / Anaheim

**ORANGE COUNTY IVHS ACTION PLAN
PROGRAM IMPLEMENTATION SUMMARY**

Second-Level Priority

	Description	Location/Phasing	Time Frame	Capital + Installation Cost (000's)	Engineering Design Cost	Responsible Agency
Freeway MIS	CMS & Low Power HAR	<p><u>Priority List</u> <u>Smart Corridors</u> 1. I-405 2. SR-55 3. SR-22 4. SR-91 5. I-5 6. SR-57 Other Freeway Segments</p>	5 years	2,674	481	Caltrans
Arterial MIS	CMS, Trailblazers, Mobile CMS, low-power HAR	<p><u>Priority List</u> <u>Smart Corridor Alternates</u> 1. Bolsa Chica from Warner to SR-22 SR-22 from Bolsa Chica to Beach Beach from Talbert to SR-22 Bolsa/First/Grand/Barranca from Bolsa Chica to Jeffrey Edinger/Irvine Center from Bolsa Chica to I-405 Warner from Bolsa to Grand Talbert/MacArthur from Beach to University SR-73 from I-405 to University University/Jeffrey from MacArthur to Irvine Center 2. Lincoln from SR-57 to SR-55 Tustin from SR-91 to I-5 SR-91 from Tustin to SR-55 Red Hill from I-405 to I-5 MacArthur from I-405 to Red Hill 3. Garden Grove from SR-22 to SR-22 Seal Beach from Westminster to SR-22 Westminster/17th from Seal Beach to SR-55 Bolsa Chica from Bolsa to SR-22 Tustin from First to SR-22 Bolsa/First from Bolsa Chica to Tustin 4. Orangethorpe from Beach to SR-90 Beach from Lincoln to Orangethorpe La Palma from Beach to SR-90 Lincoln/Santa Ana Canyon from Beach to SR-90 SR-90 from Santa Ana Canyon to Orangethorpe</p>	5 years	322 1,192 1,265 1,287 1,506 354 1,112 242 459 201 717 32 363 97 443 89 1,160 169 185 580 943 153 975 1,007 1,402	58 215 228 233 271 64 200 44 83 36 129 6 65 17 80 16 209 30 33 104 170 28 175 181 252	Local / GMA

**ORANGE COUNTY IVHS ACTION PLAN
PROGRAM IMPLEMENTATION SUMMARY**

Second-Level Priority

	<u>Description</u>	<u>Location/Phasing</u>	<u>Time Frame</u>	<u>Capital + Installation Cost (000's)</u>	<u>Engineering Design Cost</u>	<u>Responsible Agency</u>
Freeway Instrumentation	System Detectors / CCTV / VIDS	Harbor from Boisa to Lincoln Boisa/First from Euclid to Newport Newport from First to Irvine Edinger/Irvine Center/Moulton from Euclid to I-5 Dyer from Red Hill to Grand Grand from Dyer to First Red Hill from Alton to Irvine Irvine/Trabuco/Marguerite from SR-55 to Oso Oso from I-5 to Marguerite 6. State College from I-5 to SR-90 I-5 from SR-57 to State College SR-90 from State College to SR-57 Smart / Super Streets Other Significant Roadways	10 years 10 years	475 475 137 1,039 48 201 274 1,249 64 354 64 32 12,084 4,028	86 86 25 187 9 36 49 225 12 64 12 6 2,175 725	Local / GMA Local / GMA
Arterial Instrumentation	System Detectors / CCTV / VIDS	Other Freeway Segments	5 years	1,602	288	Caltrans
Corridor Ramp Metering	System Detection / CCTV / VIDS	Priority List Smart / Super Streets Other Significant Roadways	5 years	24,195 8,065	4,355 1,452	Local / GMA
TMCs	Ramp Meters and Software	Remaining Network Segments	5 years	10,710	1,928	Caltrans
	Sub-regional TMCs	To be determined	10 years	17,325	3,119	Local / GMA

**ORANGE COUNTY IVHS ACTION PLAN
PROGRAM IMPLEMENTATION SUMMARY**

Third-Level Priority

	<u>Description</u>	<u>Location/Phasing</u>	<u>Time Frame</u>	<u>Capital + Installation Cost (000's)</u>	<u>Engineering Design Cost</u>	<u>Responsible Agency</u>
AVL	AVL for Other Public Fleets	Paratransit CHP Rail Other To be determined	10 years 10 years 10 years 10 years 20 years	974 420 105 516 N/A	175 76 19 93	OCTA CHP OCTA Local Private / OCTA
Interactive Rideshare INTER-RIDE	Database, Telephone System, TIS Integration	Telephone System TIS Integration	5 years 5 years	578 53	104 10	OCTA OCTA
In-vehicle Information / Navigation (INVISION)	Data Server, Communications Links, Vehicle-Roadway Communications	Data Server Smart Corridors Smart / Super Streets Other Roadways	5 years 10 years 10 years 10 years	252 90,484 90,484 20,108	45 16,287 16,287 3,619	OCTA Local / OCTA Local / OCTA Local / OCTA
Decision Support Systems	Smart Corridor Expert Systems	Priority List 1. I-405 2. SR-55 3. SR-22 4. SR-91 5. I-5 6. SR-57	10 years 10 years 10 years 10 years 10 years 10 years	2,625 2,625 2,625 2,625 2,625 2,625	473 473 473 473 473 473	All involved agencies
Real-time Intermodal Travel Advisory (RITA)	Software Integration with TIS	Countywide	5 years	158	28	OCTA

ORANGE COUNTY IVHS ACTION PLAN
PROGRAM IMPLEMENTATION SUMMARY

Fourth-Level Priority

	<u>Description</u>	<u>Location/Phasing</u>	<u>Time Frame</u>	<u>Capital + Installation Cost (000's)</u>	<u>Engineering Design Cost</u>	<u>Responsible Agency</u>
Support AVCS Development	Vehicle-Infrastructure Communication & Control	To be determined	20 years	217,350	39,123	Private / OCTA / Caltrans

**ORANGE COUNTY IVHS ACTION PLAN
PROGRAM IMPLEMENTATION SUMMARY**

Enabling Projects

<u>Description</u>	<u>Location/Phasing</u>	<u>Time Frame</u>	<u>Capital + Installation Cost (000's)</u>	<u>Engineering Design Cost</u>	<u>Responsible Agency</u>
Agency Traffic Operations Support	Countywide	Duration	370 (annual)		OCTA/Local
Public Information Campaign	Countywide	Duration	40 (annual)		OCTA/Private
Detector Maintenance	Countywide	Duration	200 (annual)		OCTA/Local